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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,557	06/04/2007	Maher Kalaji	31229-232367	4750

26694 7590 02/16/2011

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EXAMINER	
DINH, BACH T	

ART UNIT	PAPER NUMBER
1724	

MAIL DATE	DELIVERY MODE
02/16/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,557	KALAJI ET AL.	
	Examiner	Art Unit	
	BACH T. DINH	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *17-27* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Summary

1. This is the response to the communication filed on 11/24/2010.

2. Claims 1-28 remain pending in the application; claims 17-27 are withdrawn from consideration.

3. The application is not in condition for allowance.

Request for Information

4. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application. This information request includes the following information as described in the paragraph 9 below.

5. In response to this requirement, please provide the copy of the reference "Poster 50: The Development of an Amperometric Enzyme Sensor for the Detection of Explosives" Posters of the 2003 Younger European Chemists' Conference" available on 08/26/2003 as cited in the international search report submitted on 06/09/2006. In order for such reference to be cited in the international search report, such reference must be made public. Therefore, Applicant is respectfully requested to submit a copy for the above reference.

6. The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first

communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

7. The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

8. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-7, 9, 13, 16 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willner et al. (US 5,443,701) in view of Ruger et al. (US 5,834,224) with further evidence provided by Shah et al. (US 5,777,190).

Addressing claims 1-7 and 28, Willner discloses a sensing device (figure 1) comprising an electrode 1 comprising a noble metal layer (col. 9 lines 29-37 or 9:29-37, gold electrode), on which a layer 4 of glutathione reductase (9:46-50) is immobilized on the gold electrode (Abstract). Furthermore, Willner discloses the biological material comprises a plurality of sulphur-containing functional groups (figures 20 and 22).

Shah discloses that glutathione reductase catalyzes nitroaromatic compounds (3:18-35); therefore, the glutathione reductase is a nitroreductase enzyme.

Willner is silent regarding a plurality of cysteine residues and wherein conjugation of the biological material and the noble metal layer is via cysteine linkages.

Ruger discloses an electrochemical sensor comprises enzymes (3:62-4:13) that are immobilized onto a noble metal layer (3:1-9) via a plurality of cysteine linkages (4:14-24, 6:14-19). Thus, since the enzyme is linked to the plurality of cysteine residues; the enzyme is interpreted as comprising the plurality of cysteine residues.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the sensing device of Willner with the plurality of cysteine linkages for immobilizing the enzyme onto the noble metal layer as disclosed by Ruger because the plurality of cysteine residues enhance the bond between the enzyme and the noble metal electrode, provide the thiol binding groups required by Willner and provide high

covering density of enzyme coupled with high conductivity and sensitivity (Ruger, 2:24-29).

Addressing claim 9, Willner discloses the electrode comprises a semi-permeable membrane that encloses the electrode and is permeable to the analyte (5:62-65); therefore, the immobilized enzyme is also covered by the semi-permeable membrane or the fluid permeable cover layer.

Addressing claim 13, Willner discloses the noble metal layer is gold (2:63-69).
Ruger discloses the noble metal layer is gold (3:1-9).
Furthermore, the limitation of current claim is drawn to the process of forming the biological material on the noble metal layer, which does not further structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the limitation of current is treated as a layer of nitroreductase is attached to the gold layer via a plurality of cysteine residues at a location on the enzyme that does not interfere with the activity of the enzyme.
In the modification discussed in the rejection of claim 1, the plurality of cysteine residues are used for immobilizing the enzyme onto the noble metal layer; therefore, the plurality of cysteine residues are at a location that does not interfere with the enzymatic activity (Ruger, 4:45-49).

Addressing claim 16, Willner discloses the nitroreductase is operably associated with an electron mediator (5:47-57).

12. Claims 8 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willner et al. (US 5,443,701) in view of Ruger et al. (US 5,834,224) as applied to claims 1-7, 9, 13, 16 and 28 above, and further in view of Grove et al. (WO 03/018788) and Shah et al. (US 5,777,190).

Addressing claim 8, it is noticed from the originally filed specification the SEQ ID1 and SEQ ID2 refer to the nfnB gene in E. coli and pnrA gene in P. putida, respectively. Furthermore, the limitation of current claim is drawn to the process of making the nitroreductase enzyme, which does not further structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the claim is treated as nitroreductase enzyme encoded by either the nfnB gene or pnrA gene according to the originally filed specification.

Willner is silent regarding the nitroreductase enzyme is encoded by either the nfnB gene or pnrA gene.

Grove discloses nitroreductase enzyme; wherein, the nitroreductase enzyme is encoded by the nfsB gene or nfnB gene (page 2 line 16 to page 3 line 19).

Shah discloses using nitroreductase enzyme to control the reduction of nitroaromatic compounds (1:13-15).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the enzyme of Willner with the nitroreductase enzyme as disclosed by

Grove because the nitroreductase enzyme of Grove, which reduces nitroaromatic compounds, would allow one to measure explosives such as TNT (Shah, 2:31-44).

Addressing claims 14-15, it is noticed from the originally filed specification that the SEQ ID3 is the nfnB gene with genetic sequence to express a 6 cysteine residues inserted at the N-terminal end (page 7 lines 23-29 of the specification) and the SEQ ID5 is the pnrA gene with genetic sequence to express a 6 cysteine residues inserted at the N-terminal end (page 7 line 31 to page 8 line 4). Furthermore, SEQ ID4 and SEQ ID6 are the nitroreductase enzymes as the translation products of SEQ ID3 and SEQ ID5, respectively (page 8 lines 6-9). In other words, SEQ ID4 is the nitroreductase enzyme expressed by the nfnB gene with a six cysteine residues attached at the N-terminal; likewise, SEQ ID6 is the nitroreductase enzyme expressed by the pnrA gene with a six cysteine residues attached at the N-terminal. Additionally, the limitation of current claim is drawn to the process of binding the nitroreductase enzyme to the gold electrode, which does not structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the limitation of claims 14 and 15 in light of claim 13 is treated as the nitroreductase enzyme expressed by the nfnB gene or pnrA gene is attached to the gold electrode via the six cysteine residues provided at the N-terminal of the nitroreductase enzyme.

Willner is silent regarding the nitroreductase enzyme is encoded by either the nfnB gene or pnrA gene having six cysteine residues attached at the N-terminal for binding the enzyme to the gold electrode.

Grove discloses nitroreductase enzyme; wherein, the nitroreductase enzyme is encoded by the nfsB gene or nfnB gene (page 2 line 16 to page 3 line 19).

Shah discloses using nitroreductase enzyme to control the reduction of nitroaromatic compounds (1:13-15).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the enzyme of Willner with the nitroreductase enzyme as disclosed by Grove because the nitroreductase enzyme of Grove, which reduces nitroaromatic compounds, would allow one to measure explosives such as TNT (Shah, 2:31-44).

Ruger discloses an electrochemical sensor; wherein, the enzyme is modified at the N-terminal attachment with a plurality of cysteine residues (4:13-24) at a location that does not interfere with the enzymatic activity (4:45-49) for binding the enzyme to the supporting material of gold or platinum (3:1-9).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the sensing device of Willner by modifying the nitroreductase enzyme disclosed by Grove with the plurality of cysteine residues at the N-terminal in the manner disclosed by Ruger because the plurality of cysteine residues would enhance the bond between the nitroreductase enzyme and the electrode, providing the thiol binding groups required by Willner and provide high covering density of enzyme coupled with high conductivity and sensitivity (Ruger, 2:24-29). Additionally, it would have been obvious for one with ordinary skill in the art to modify the N-terminal of the nitroreductase enzyme of Grove with six cysteine residues because Ruger already discloses the inclusion of a plurality of cysteine residues at the N-terminal; therefore, absent of contrary support

to show criticality, choosing to incorporate six cysteine residues is obvious as a matter of engineering choice and is well within the technical grasp of one with ordinary skill in the art. Furthermore, the amount of cysteine residues at the N-terminal affects the bond between the enzyme and the electrode; therefore, one would have arrived at the six cysteine residues at the N-terminal of the nitroreductase enzyme when performing routine experiment with the amount of cysteine residues incorporated at the N-terminal of the enzyme in order to optimize the bond between the enzyme and the electrode.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Willner et al. (US 5,443,701) in view of Ruger et al. (US 5,834,224) as applied to claims 1-7, 9, 13, 16 and 28 above, and further in view of Matsumoto et al. (US 5,795,774) with further evidence provided by Shah et al. (US 5,777,190).

Addressing claim 10, Willner is silent regarding the cover layer comprises a polycarbonate or polyacrylate material.

Matsumoto discloses a biosensor; wherein, polycarbonate is used as a layer for allowing the diffusion of analyte while restricting the diffusion of macromolecules (2:15-31).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the membrane of Willner with the polycarbonate material of Matsumoto because the polycarbonate material restricts the diffusion of macromolecules while allowing the diffusion of the analyte; thereby, increasing the range of concentrations which the sensor could be used to measure (Matsumoto, 2:22-26).

14. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willner et al. (US 5,443,701) in view of Ruger et al. (US 5,834,224) as applied to claims 1-7, 9, 13, 16 and 28 above, and further in view of Saini et al (US 5,521,101) with further evidence provided by Shah et al. (US 5,777,190).

Addressing claims 11-12, Willner is silent regarding the noble metal layer is mounted on an insulating substrate and is connected to a surface not comprising the biological material, to one or more layers of conductive, semi-conductive or insulating material. Saini discloses a sensor for measuring TNT like that of Willner; wherein, the gold electrodes (9:65-67) are mounted on an insulating substrate 4 (10:9, quartz substrate) or a surface not comprising the biological material.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the device of Willner with the insulating substrate in the manner disclosed by Saini because the insulating substrate would provide support for the gold electrode (Saini, figure 1, 10:8-9).

15. Claims 1-7, 9, 11-13, 16 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruger et al. (US 5,834,224) in view of Willner et al. (US 5,443,701) with further evidence provided by Shah et al. (US 5,777,190).

Addressing claims 1-7, 11-12 and 28, Ruger discloses a sensing device (Abstract, electrochemical sensor) comprising an electrode comprising a noble metal layer (3:1-9) formed on a glass support or polycarbonate (3:10-19), on which layer is located an enzyme (3:62-4:8), wherein the biological material comprises a plurality of cysteine

residues (4:14-24, a plurality of amino acids including cysteine residues) and wherein conjugation of the biological material and the noble metal layer is via cysteine linkages (4:14-24).

Ruger is silent regarding the biological material having nitroreductase activity.

Willner discloses a sensing device comprising glutathione reductase (9:46-50) immobilized on the gold electrode (Abstract).

Shah discloses that glutathione reductase catalyzes nitroaromatic compounds (3:18-35); therefore, the glutathione reductase is a nitroreductase enzyme.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the sensing device of Ruger with the glutathione reductase enzyme disclosed by Willner because the glutathione reductase enzyme allows one to detect glutathione in liquid medium (Willner, Abstract).

Addressing claim 13, the limitation of current claim is drawn to the process of forming the biological material on the noble metal layer, which does not further structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the limitation of current is treated as a layer of nitroreductase is attached to the gold layer via a plurality of cysteine residues at a location on the enzyme that does not interfere with the activity of the enzyme.

In the modification discussed in the rejection of claim 1, the plurality of cysteine residues are used for immobilizing the enzyme onto the noble metal layer; therefore, the plurality

of cysteine residues are at a location that does not interfere with the enzymatic activity (Ruger, 4:45-49).

Addressing claims 9 and 16, Ruger is silent regarding the biological material is covered by a fluid permeable cover layer and the nitroreductase is operably associated with an electron mediator.

Willner discloses a semi-permeable membrane that encloses the electrode and is permeable to the analyte (5:62-65); therefore, the immobilized enzyme is also covered by the semi-permeable membrane or the fluid permeable cover layer. Furthermore, the nitroreductase is operably associated with an electron mediator (5:47-57).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the sensing device of Ruger with the electron mediator and the semi-permeable membrane covering the enzyme as disclosed by Willner because the electron mediator efficiently transfers electron between the electrode material and the enzyme (Willner, 2:8-18) and the semi-permeable membrane encloses a small volume of solution with the tumbling component between it and the electrode material (Willner, 5:58-65).

16. Claims 8 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruger et al. (US 5,834,224) in view of Willner et al. (US 5,443,701) as applied to claims 1-7, 9, 11-13, 16 and 28 above, and further in view of Grove et al. (WO 03/018788) and Shah et al. (US 5,777,190).

Addressing claim 8, it is noticed from the originally filed specification the SEQ ID1 and SEQ ID2 refer to the nfnB gene in E. coli and pnrA gene in P. putida, respectively. Furthermore, the limitation of current claim is drawn to the process of making the nitroreductase enzyme, which does not further structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the claim is treated as nitroreductase enzyme encoded by either the nfnB gene or pnrA gene according to the originally filed specification.

Ruger and Willner are silent regarding the nitroreductase enzyme is encoded by either the nfnB gene or pnrA gene.

Grove discloses nitroreductase enzyme; wherein, the nitroreductase enzyme is encoded by the nfsB gene or nfnB gene (page 2 line 16 to page 3 line 19).

Shah discloses using nitroreductase enzyme to control the reduction of nitroaromatic compounds (1:13-15).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the enzyme of Ruger and Willner with the nitroreductase enzyme as disclosed by Grove because the nitroreductase enzyme of Grove, which reduces nitroaromatic compounds, would allow one to measure explosives such as TNT (Shah, 2:31-44).

Addressing claims 14-15, it is noticed from the originally filed specification that the SEQ ID3 is the nfnB gene with genetic sequence to express a 6 cysteine residues inserted at the N-terminal end (page 7 lines 23-29 of the specification) and the SEQ ID5 is the pnrA

gene with genetic sequence to express a 6 cysteine residues inserted at the N-terminal end (page 7 line 31 to page 8 line 4). Furthermore, SEQ ID4 and SEQ ID6 are the nitroreductase enzymes as the translation products of SEQ ID3 and SEQ ID5, respectively (page 8 lines 6-9). In other words, SEQ ID4 is the nitroreductase enzyme expressed by the nfnB gene with a six cysteine residues attached at the N-terminal; likewise, SEQ ID6 is the nitroreductase enzyme expressed by the pnrA gene with a six cysteine residues attached at the N-terminal. Additionally, the limitation of current claim is drawn to the process of binding the nitroreductase enzyme to the gold electrode, which does not structurally limit the claimed sensing device (please see MPEP 2112.01). For the purpose of examination, the limitation of claims 14 and 15 in light of claim 13 is treated as the nitroreductase enzyme expressed by the nfnB gene or pnrA gene is attached to the gold electrode via the six cysteine residues provided at the N-terminal of the nitroreductase enzyme.

Ruger and Willner are silent regarding the nitroreductase enzyme is encoded by either the nfnB gene or pnrA gene having six cysteine residues attached at the N-terminal for binding the enzyme to the gold electrode.

Grove discloses nitroreductase enzyme; wherein, the nitroreductase enzyme is encoded by the nfsB gene or nfnB gene (page 2 line 16 to page 3 line 19).

Shah discloses using nitroreductase enzyme to control the reduction of nitroaromatic compounds (1:13-15).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the enzyme of Ruger and Willner with the nitroreductase enzyme as

disclosed by Grove because the nitroreductase enzyme of Grove, which reduces nitroaromatic compounds, would allow one to measure explosives such as TNT (Shah, 2:31-44).

Ruger discloses an electrochemical sensor; wherein, the enzyme is modified at the N-terminal attachment with a plurality of cysteine residues (4:13-24) at a location that does not interfere with the enzymatic activity (4:45-49) for binding the enzyme to the supporting material of gold or platinum (3:1-9).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the sensing device of Ruger and Willner by modifying the nitroreductase enzyme disclosed by Grove with the plurality of cysteine residues; specifically six cysteine residues, at the N-terminal in the manner disclosed by Ruger because Ruger already discloses the inclusion of a plurality of cysteine residues at the N-terminal; therefore, absent of contrary support to show criticality, choosing to incorporate six cysteine residues is obvious as a matter of engineering choice and is well within the technical grasp of one with ordinary skill in the art. Furthermore, the amount of cysteine residues at the N-terminal affects the bond between the enzyme and the electrode; therefore, one would have arrived at the six cysteine residues at the N-terminal of the nitroreductase enzyme when performing routine experiment with the amount of cysteine residues incorporated at the N-terminal of the enzyme in order to optimize the bond between the enzyme and the electrode.

17. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruger et al. (US 5,834,224) in view of Willner et al. (US 5,443,701) as applied to claims 1-7, 9, 11-13, 16 and 28 above, and further in view of Matsumoto et al. (US 5,795,774) with further evidence provided by Shah et al. (US 5,777,190).

Addressing claim 10, Willner is silent regarding the cover layer comprises a polycarbonate or polyacrylate material.

Matsumoto discloses a biosensor; wherein, polycarbonate is used as a layer for allowing the diffusion of analyte while restricting the diffusion of macromolecules (2:15-31).

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the membrane of Ruger and Willner with the polycarbonate material of Matsumoto because the polycarbonate material restricts the diffusion of macromolecules while allowing the diffusion of the analyte; thereby, increasing the range of concentrations which the sensor could be used to measure (Matsumoto, 2:22-26).

Response to Arguments

18. Applicant's arguments filed 11/24/2010 have been fully considered but they are not persuasive.

With respect to Applicant's assertion regarding the Request for Information, the Applicant is thanked for providing the copies of the NPL documents. With regard to the requested copy of the "Poster 50: The Development of an Amperometric Enzyme Sensor", Applicant indicated that the poster was never presented and was withdrawn before the conference. However, whether the poster was presented or not is immaterial to

the fact that it was made public as of 08/26/2003 as indicated in the international search report. Thus, the Applicant is respectfully requested to submit a copy of the poster cited in the international search report.

With respect to Applicant's arguments regarding the 35 U.S.C. 103(a) rejections, the arguments are not persuasive because contrary to Applicant's assertion that Ruger does not disclose direct binding of an enzyme to a metal layer, Ruger discloses the enzyme is immobilized on a noble metal layer via cysteine linkages as discussed above in the rejections of claim 1. Furthermore, the claims do not require "direct binding of an enzyme to a metal layer" as asserted in the arguments because the claim recites that the enzyme binds to the noble metal layer via the cysteine linkages. Thus, it appears that Applicant's arguments are not pertained to the content of current claims. For the reasons above, Examiner maintains the position that claims 1-16 and 28 are obvious over the disclosure of the prior art as stated above.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH T. DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

BD
02/09/2011